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October 16, 1957

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Reference: Contract RD-113, Task III

Subject: Revision of Schedules

Gentlemen:

The subject task has recently been reviewed with your cognizant project engineer and note made of some modifications which would significantly improve the system capability. Approximately one month ago certain developments in process here on exposure control systems brought to light an improved approach which offered many significant advantages over that being prepared for this task. Meetings were arranged to discuss aspects of this task with regard to maximizing this system capability with regard to reliability, broad application and low power requirements, exploring the advantages of these modifications in terms of improved system performance. Items of discussion were as follows:

1. Exposure control with preset minimum underexposure control applied to shutter.

2. Partial framing of magazines.

3. Increased cycling rate.

4. Variable burst control sequence.

5. Camera operate control from external sensors.

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Exposure control represents a significant factor in photographic performance. The current state of the art is replete with many means for accomplishing exposure control but most of these techniques deal primarily with aperture control. External mechanical drives for long focus lenses are quite vulnerable operationally and require significant power for driving means. The modification referred to in this application is that of placing the presently planned control upon the shutter rather than upon the iris. By means of such exchange the following benefits are derived for this equipment over and above that originally provided:

a. Extension of shutter exposure range from 1/25 second to 1/1200 second.

b. Minimal battery drain due to reduced power requirements.

c. Higher reliability based upon minimization of exposed moving parts.

d. Each exposure will be made with the shortest exposure possible consistent with a given scene illumination level such that effect of motion (blur) during exposure (moving targets) will be at a minimum.

e. Camera body would also now be able to accept any future lenses without costly modification, including variable focus lenses which have no iris mechanism.

f. The shutter control obviates the need for a selector switch which would previously require manual positioning when lenses were interchanged, thereby minimizing operational errors. Lenses may now be plugged in interchangeably with fully automatic compensation taking place.

g. The shutter control also allows provision whereby deliberate underexposure of two (2) stops value is permissable.

h. With new shutter range, camera can utilize advantageously the new films capable of extreme speeds.

i. Increased shutter speed range significantly extends the usable portion of the day that can be utilized for photographic purposes.

j. This system will provide maximim information content of exposed negatives.

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The one particular disadvantage discussed was that related to limitation of depth of field. To a great extent however, it was pointed out that by means of range finder assistance the given depth of field for each of these lenses may be positioned for effective performance. Most of these lenses are equipped with focus adjustments. To this extent provisions are to be made for mounting of a suitable compact rangefinder upon the camera body..

It should at this point be emphasized that the basis light sensing system is the same as previous but for the mechanical output drive. now to be used on the shutter rather than the iris diaphragm.

With regard to (2) above, the request for partial framing (1/2 frame) was discussed and a suitable solution found. The present fixed aperture plate will be remachined to allow for insertion of a half frame mask. In addition, provisions will be made for interchanging film sprockets to match new frame height.

With regard to (3) above a review of the transport mechanism is presently in process in an effort to determine what additional rate increase may be obtained without further modifications. Our findings will be made known shortly.

With regard to (4) above, we are similarly reviewing the electrical schematic in an effort to determine the ease with which we can now provide a variety of burst sequences up to a maximum of three (3) minutes at the maximum cycling rate.

With regard to (5) above, the camera receptacle will be modified to allow for external sensor control (infra-red, seismic, etc.) to operate the burst sequence control.

The discussion of the above subjects are considered to be factors which if incorporated will contribute to the marked improvement of this special equipment. With the above we feel that the components to be produced would possess features not found anywhere in the state of the art as known today.

As discussed with your project engineer the schedule is to be modified so as to separate the first article system from the five additional units to follow for the full quantity under order. In view of the above the following schedule information was derived in accordance with the changes referred to above.

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1. First system completion by January 31, 1957.

2. Five additional systems within four (4) months after approval of first system.

The separation of the first system from the additional quantity is we believe, best suited for purposes of this program. Many changes have occured and already incorporated in parts for the entire quantity. However, the highly specialized nature of this equipment deserves every possible consideration so as to enhance its capability. With reference to the additional quantity of five (5) units, approximately 40% of the machine parts are presently completed with all raw castings in our inventory. No further work on this quantity will be accomplished until the prototype unit is confirmed.

We would greatly appreciate your consideration of the facts contained herein and your response thereto. We sincerely trust that you find this acceptable.

Sincerely yours,

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HRG:aw